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Development of Rubric for Measuring Transformative Learning in Learning Assistants

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Development of Rubric for Measuring Transformative Learning in Learning Assistants

ABSTRACT

In Fall 2016, a training seminar was established to help prepare Learning Assistants to succeed in their positions. The goal of training is to better prepare the LAs for their position and provide them with tools to effectively interact with students. The effectiveness of this seminar was measured by conducting a survey to assess for levels of transformation. This preliminary work detected signs of transformation and found the training seminar to be effective in reaching its goal. This work also led to revised method of how to measure this transformation. A new survey was developed which allows better comparison of various training approaches. The current work evaluates the revised survey for its ability to detect transformation in the LAs and investigates its utility in detecting differences among various approaches to LA training. Four categories of transformation were assessed for this study; confidence, skills, perspective, and identity. This study found that the newly formed survey was effective and easy to evaluate for transformation. The results of the study also showed further evidence that LA training influences transformation.

INTRODUCTION

The Learning Assistant Program at Bowling Green State University (BGSU) has grown a lot in the last few years, beginning with one faculty member teaching with six LAs per semester to up to eight faculty and eighty LAs per semester. Learning Assistants (LAs) are undergraduate students who work with faculty in a course in which they have succeeded to help teach students. LAs work to facilitate small group discussions and interactive learning activities to get students more engaged with the material. Classrooms with LAs tend to be large introductory classes in which students typically have a harder time succeeding. The goal of the LA program is to provide students with more one on one attention and resources for them to succeed in the class.

In the fall of 2016, a training seminar was formed to help LAs adjust to their positions and be more effective in their job. Following the formation of this seminar, a study was done to test the effectiveness of the training seminar by measuring transformative learning gains in those LAs who completed training and those who did not. The conclusion of this study was that the Learning Assistant Training Seminar did have an impact on transformative learning, however, there were improvements to be made. One of the issues that this study faced was with the survey used to measure these transformations. Thus, a new survey was created to better evaluate these effects.

There have now been two more semesters of the Learning Assistant Training. In spring of 2017, the training was modified with reduced face to face interactions. In the fall of 2017, the training was completely online. The focus of the current study was to figure out how to use the new survey to evaluate its effectiveness over the two semesters that it was used. This will lay the ground work to for future analysis in comparing the differences in transformation across the semesters. Based on the work of the current and past study regarding the effectiveness of LA training, these results could show a correlation with the type of training the LA experienced and their level of transformation.

Literature Review

The transformative learning theory was first proposed by Jack Mezirow and it stems from the idea that learning can change people's perspectives and allow them to see themselves differently in the world (Apte 2009). This transformation can be important in shaping individuals and preparing them for the real world. There has been a significant amount of research looking at how to facilitate this transformative learning and how to measure it among students.

When creating a transformative learning program, it is important to take into account both the perspective of the student and of the instructor in order to maximize the opportunity for transformation to occur (Apte 2009). This is important because in order to trigger transformative learning in students, instructors need to understand the current viewpoint of the students. It is also interesting to note that the instructors may also go through some transformation while creating the program and working through the issues of creating a transformative learning environment (Apte 2009).

A study done on a learning assistant (LA) program at the University of Colorado found that an active learning environment not only impacted the students but also the LAs (Otero et al. 2010). The LA program was first adopted in order to prepare better physics teachers through giving students better knowledge of the content. The program was successful in achieving this goal as several of the LAs actually ended up going into physics education. It was also found that through transforming the classroom, students had improved learning and understanding of the material. Not only that, but the LAs also gained a better understanding and an improved attitude toward the subject matter (Otero et al. 2010). This is just one example of how the learning assistant program and an active learning environment contributes to transformative learning.

Another study was done which focused on the transformation of students in an active learning classroom. In this study, the instructor created an assignment called, "The Curiosity Project," in which students chose any topic that they would research throughout the entire semester (Mackinnon 2017). The project had very limited directions which meant the students had to do a lot of learning on their own. Upon completion of the project, Mackinnon conducted a survey to see how the students felt about the project. Many of the students stated that they had some hesitations and were worried about doing this project at the start of the semester but felt more confident in their abilities at the end. It is clear that this project resulted in transformative learning and provides yet another example of how active learning impacts students (Mackinnon 2017).

One issue that has been researched is how do we measure transformative learning. Springfield, Smiler, and Gwozdek came up with a rubric aimed at solving this problem (Springfield et al. 2015). The rubric measures for five types of changes that students may undergo; confidence, pride, skills, perspective, and identity. In order to code for these changes, we first need to ask the right questions to receive quality answers that will demonstrate whether transformative learning has occurred. The transformation rubric then provides information on how to code the answers from these answers. The rubric contains key words to look for in order to determine a transformation in that specific category (Springfield et al. 2015). This rubric is what will be used in the current study to code the data.

METHODS

In the spring of 2017 a new type of training was developed that had reduced face to face interaction for each Learning Assistant (LA) to complete. Those LAs that completed the Learning Assistant Training Seminar in the previous semester were not required to do the training again, though they were welcome to participate if desired.

In fall of 2017, the training was changed to be online only. Once again, LAs who had previously been trained did not need to complete the online classes.

At the end of each semester, a survey was given to every LA, trained and untrained. The responses from these surveys were put into two separate Microsoft Excel spreadsheets, one for each semester. The names and ID numbers for each student were removed. The survey contained open-ended questions that were developed specifically with this type of study in mind.

The responses to the surveys were assessed using the Gwozdek, Smiler, and Springfield rubric, which was also used in the previous study. This rubric can be found as figure 1. The trait of pride was eliminated because it was not detected in previous work (Jakyma, 2017). The traits were color coded as follows; confidence was indicated by red, skills by blue, perspective by green, and identity by purple. For partially-transformative gains, the text color for each response was changed and for transformative gains, the color of the cell in the spreadsheet was changed to the appropriate color. Those responses that showed no signs of transformation were left black.

Type-of-Change Codes		
Code and Description	Details	Keywords & Examples
Confidence: Students' perception of their comfort or perceived ability to do a thing	This is NOT better skill, but rather greater <i>belief</i> in one's ability to use a skill. Often double-coded with skill or identity. For example, "I am much more confident about my writing skills" would be double-coded for both Confidence and Skill.	Confident, comfortable, easy, no longer a problem "I used to be terrified of public speaking, but now it doesn't bother me." "I'm much more comfortable networking now."
Pride: Expressing gratification in an accomplishment	Similar to confidence, but usually very explicit about being proud of a skill.	"I found it rewarding to..." "I was so proud that I..." Do not code generic statements such as "I'm so proud of all of us"
Skills: anything the student has learned to DO as part of the program.	Teamwork, relationships, "soft" skills Clinical skills Communication/presentation skills Teaching skills Leadership skills (I have improved my leadership skills, like listening, communicating, etc.)	"I can now..." "I have improved..." "I [verb] better..." "I have become more [adjective]..."
Perspective: changes in how the student understands or sees <i>other</i> people	Externally focused I understand SOMETHING ELSE (outside of myself) differently than I did before How I perceive other people is different How I think/believe the world works is different I have a different understanding of my profession now	"I see leadership in a different way; I used to think leadership was X, now I think it's Y." "I never realized how hard it is to sign up for Medicaid." "I used to think the best way to change someone's mind was to give them more data. Now I know it's more complicated."
Identity: Changes in how students understand or see themselves.	Internally focused Vision of self, career, path Traits about myself: I AM a different person or kind of person Change in motivation or direction (I'm now motivated to...) Confirmation of motivation or direction (non-transformative change only)	"I <i>am</i> now..." "I have become a better [noun]..." "I see myself as a Leader; my vision of <i>myself</i> as a leader has changed" "I confirmed that I still want to..." (always non-transformative) Role, see myself

Figure 1: Transformation rubric that was created by Springfield, Smiler, and Gwozdek that was used in this study to code the survey results.

The answers from each question for every student was carefully evaluated to look for evidence of transformation. This was done by looking for key phrases, as written in the rubric. For the trait of confidence some key phrases included; "more confident," "comfortable," or "easier." For skills, the use of words like; "I can do ____ better," or "improved," were considered to show transformation. A few key phrases that showed transformation in perspective were; "I see ____ differently," or "I now realize..." Lastly, some examples of phrases that showed transformation in identity included; "I now see myself," or "I am now..."

Responses were considered “transformative” if you could clearly see a change in a person. This was mostly shown through the respondent’s personal comparison to how they felt before becoming an LA. An example of a transformative gain is as follows:

“I usually am very shy during any sort of presentations or being in front of people so I was worried when I thought that this role would be only consisting of this or having this feeling; however, I grew comfortable in the role of mentor very quickly and thought that being able to talk to students one on one to help with any questions they had was not only a good learning experience for me and them, hopefully, but was a rewarding experience overall.”

This response was coded as transformative in the trait of confidence. In this student’s response, they mentioned what their concerns were at the beginning of the semester and then continued to explain how their position of an LA changed that. The use of words like, “I grew more comfortable,” shows that the transformation was in confidence.

Responses were considered “partially-transformative” if the student mentioned a change but did not go into depth or mention anything about how they felt before. Here is an example of a partially transformative response, in the trait of confidence:

“I am much more comfortable teaching and can see the benefits of LAs for learning”

The student states that they are “much more comfortable,” indicating transformation in confidence. The response can only be assessed as “partially-transformative,” however because they give no information about how they felt before starting the position.

The student responses for each semester were coded as shown above.

RESULTS

Each of the responses to the survey were evaluated and coded according to the methods above. The traits of confidence, skill, perspective, and identity were all assessed for transformative gains and partially-transformative gains. From evaluating these responses, the above rubric was modified to apply to Learning Assistants and better assess these results. This rubric is provided below as figure 2.

Trait	Transformed	Partially- Transformed
Confidence	<p>Gives details about their feelings and nerves at the start of their position and how that has changed.</p> <ul style="list-style-type: none"> • “I use to be very shy/quiet/reserved ...now I feel more comfortable/confident” • “At the beginning I was nervous about... now I am less nervous/more comfortable/more confident” 	<p>States a change but gives no details of their confidence prior to their position as an LA</p> <ul style="list-style-type: none"> • “more comfortable/ confident” • “less nervous” • “It is easier”
Skills	<p>Gives an indication of their skills before the start of their position and how they have learned or improved skills.</p> <ul style="list-style-type: none"> • “At first I didn’t know how to ____ but I’ve learned” • “I used to do this, now I do this” 	<p>States that they gained a skill but doesn’t talk about their skills prior.</p> <ul style="list-style-type: none"> • “I have improved” • “I learned how to...” • “I know how to ____ better” • “I now do ____ (ask more questions with questions)”
Perspective	<p>States their opinion or view of something before being an LA and how it has changed.</p> <ul style="list-style-type: none"> • “I used to think ____, now I think ____” • “I now see that teaching is more than just ____, it is ____” 	<p>States a change in their views but doesn’t give details of their views before.</p> <ul style="list-style-type: none"> • “I now realize” • “I see teaching differently” • “My understanding has changed” • “I have learned the importance of”
Identity	<p>States how they viewed themselves at the beginning and how that has changed.</p> <ul style="list-style-type: none"> • “I didn’t think I would be a good teacher, now I realize I am better than I thought” • “Before I started I thought of myself as ____ but now I see myself as ____” 	<p>States a change in self but doesn’t say how they were before or what they thought or how they were before.</p> <ul style="list-style-type: none"> • “I do/view ____ differently” • “I am a better ____” • “I realized that I can ____ better than I thought” • “I act more ____ towards others”

Figure 2: New rubric formed to better evaluate responses to the LA survey for transformation that contains the key phrases used for each level of transformation for each trait.

While assessing these survey results, it was decided that each transformation would only be counted once for each respondent. So, if they showed partial-transformation in skills for more than one question, it would only be counted once. Also, if the student showed a transformative gain in a trait and in another question showed a partially-transformative gain in that same trait, it would only be counted as transformed not both.

For spring of 2017, there were a total forty-six respondents. The results of the survey from that semester were added together and can be found in figure 3.

Transformation for Spring 2017		
Trait	Transformed	Partially-Transformed
Confidence	4	14
Skills	1	29
Perspective	1	32
Identity	2	26

Figure 3: Number of respondents who achieved partial transformation or Transformation during Spring 2017.

For fall of 2017, there were a total of fifty-one respondents. The results for this survey were evaluated in the same way as spring 2017, the results for fall 2017 can be found in figure 4.

Transformation for Fall 2017		
Trait	Transformed	Partially-Transformed
Confidence	4	24
Skill	2	32
Perspective	3	38
Identity	1	32

Figure 4: Number of respondents who achieved both partial-transformation or transformation during Fall 2017.

The results from each semester are displayed once again in figure 5 as a bar graph. This graph demonstrates the percentage of respondents who underwent transformation in each semester and allows for comparison between the semesters. This comparison will be useful in determining the effectiveness of different types of training across the semesters.

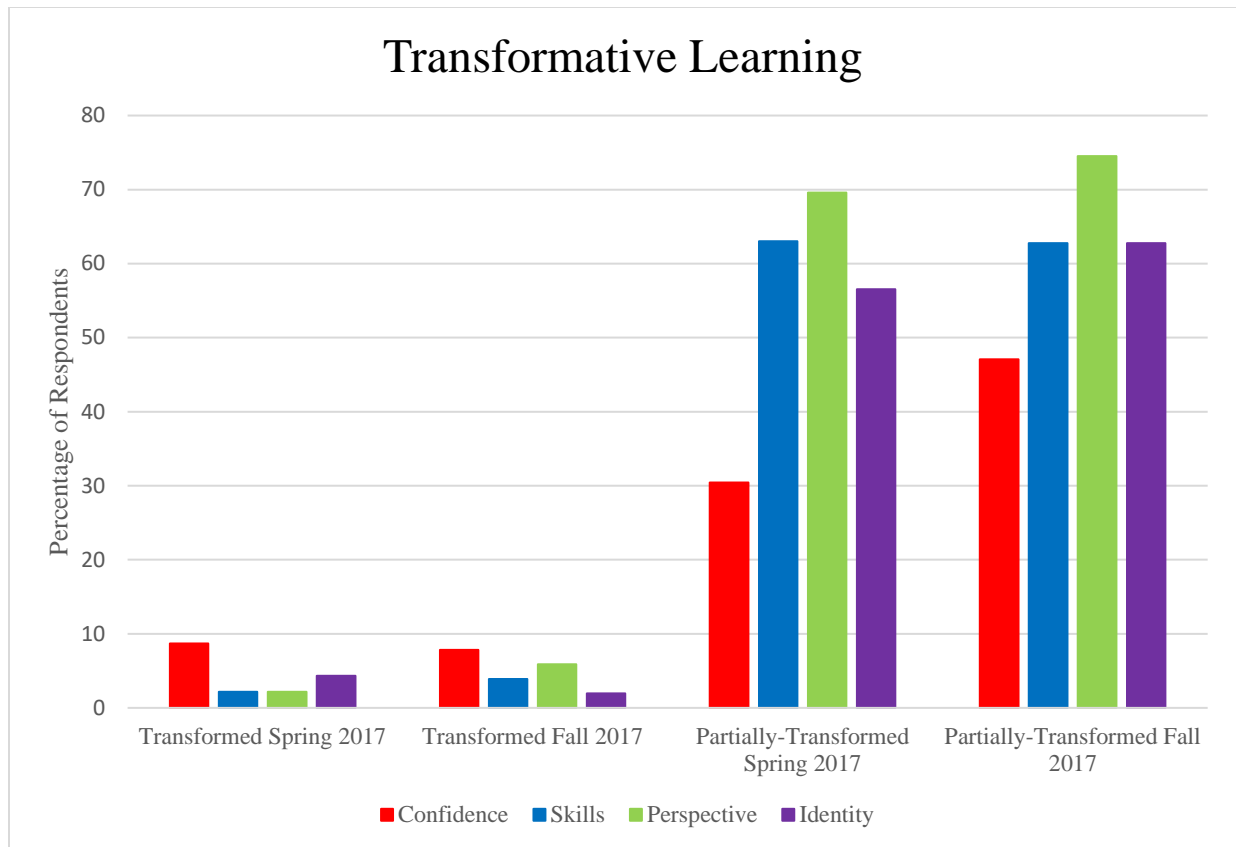


Figure 5: Bar graph of the percentage of LAs who were transformed in each of the traits, for both Spring and Fall 2017.

This bar graph shows that there was a significant difference in the percentage of students who were partially-transformed in the trait of confidence between the two semesters. In Spring of 2017, about 30% of students reported a partially transformative gain in confidence while in Fall of 2017, about 47% reported this gain.

For transformative gains, the trait that was most commonly reported was confidence (8.69% in Spring and 7.84% in Fall). The students that showed signs of transformation in this trait stated what they were worried or nervous about at the start of the semester and how they became more confident as the semester progressed. Here is an example of a response that showed this type of transformation:

“I felt confident in my ability to connect with people, but I was reserved about going into detail explaining scientific answers to students who may not have had any background in science or just simply didn't care. Throughout the course of the semester, I gained more confidence and found a lot of fulfillment helping my students learn and excel and explaining the science behind the material helped me learn it better, myself.”

There were also many LAs (30.43% in Spring and 47.06% in Fall) that mentioned that they gained confidence as a result of the LA program but did not talk about the specific concerns they had at the beginning of the semester.

“I interact more readily with my students as I am more confident in my abilities as well as talking to people.”

The above response shows a partially-transformative gain in confidence. This type of response was typical for many of the students who had this gain. Students who had gains in confidence mentioned being more comfortable talking to others and in being a leader.

For partially-transformative gains, perspective was the trait that was most commonly reported (69.57% in Spring and 74.51% in Fall). Many of the students mentioned a change in the way they viewed teaching and had more respect for the job of the professor. One response, that was coded as partially-transformative in perspective, is this:

“I think I now realize the challenges that come with trying to explain things differently to many students in a way that they will understand the material and that it is difficult to work towards each individual students needs.”

This student clearly states a change in their views. There were also a few students who gave responses that showed transformative gains in this trait. These students not only mentioned a change in their views, but also talked about what their perspective was before they began their positions as LAs. This is shown in the following example:

“This was my first time being in the teaching position instead of the learning position. It really changed my perspective on teaching and how different teaching is than just knowing the material, you also have to be able to give multiple examples and explain the material in different ways because different students learn differently. I also agree with the approach of making the students work for the answers because this increases their understanding. Before I was an LA I liked when I was just given slides and told to memorize them. After taking this class as a student I realized I really understood these concepts and could explain them to someone else which made me want to become an LA.”

Several LAs also showed signs of partial-transformation and transformation in the category of skills. The types of skills that students mentioned typically involved leadership, communication, and teaching skills. Some students also mentioned a change in their own study and time management skills because of their involvement in the LA program.

“I now ask more probing questions instead of just giving the answers to my students.”

This response was coded as partially-transformative in skills. One of the skills that is taught to LAs during training is to answer questions with questions to get students to the answer instead of just telling students the correct answer. This was also one of the most commonly mentioned skills in the survey. Some students went further in their responses and talked about the skills they had prior to being an LA and the skills they have gained or improved at the end. These responses

were coded as transformative and accounted for 2.19% of responses in the Spring and 3.94% of responses in the Fall.

“In the beginning of the semester I was not exactly sure how being an LA was going to go. I knew what it was like being a student with an LA and I wanted to get students an experience like the great one I had. I knew in the beginning of the year I would be explaining concepts to students. As the semester went on I noticed I needed to start asking questions with questions and making sure the students were understanding the concepts instead of me just giving them the answer. This was hard at first, but I feel as if I have developed the skill to be able to do this effectively.”

The final trait that was measured in this study was identity. Students that were transformed in this trait noticed a change in themselves. Many of these students found that they are better educators than they were before. Some of them also saw a change in the way they act towards others. In the Spring, 4.35% of students reported a transformative gain in identity and in the Fall 1.96% reported this. The following response shows a transformative gain in this category:

“walking in, I knew I had high knowledge of the course material and sufficient teaching abilities from prior leadership roles. I knew that i could teach the material, but i thought it would not be in a very good manner. After this semester, I am still very comfortable with the course material, and I have found out that I am a better educator than I thought. I used a variety of techniques to cater to individuals that helped me in my ability to teach.”

In this response, the student talks about how they viewed him/herself as an educator at the beginning of the semester and how they realized that they are a better educator that they thought. This comparison of oneself at the start and end of the semester shows a full transformation. If the student had simply mentioned that they were a better educator, it would have only been partially-transformative, like the following response:

“Yes, I had turned out to be a better educator than I thought, in individual session as well as large groups”

In order to do a full analysis of the effects of different types of training in future studies, it is necessary to look at the levels of transformation that were found in Fall 2016 as well. Figure 6 is a table that contains the percentages of partially-transformed or transformed students for each semester in each of the categories considered for this study. In Fall 2016 there was higher percentage of students who showed signs of transformation in each trait. It is important to remember here that the study for Fall 2016 was done using the original survey and the new survey was formed as a result of that study (Jakyma, 2017).

	Fall 2016		Spring 2017		Fall 2017	
	PT	T	PT	T	PT	T
Confidence	75.47	16.98	30.43	8.69	47.06	7.84
Skills	96.23	3.77	63.04	2.17	62.75	3.92
Perspective	81.13	0	69.57	2.17	74.51	5.88
Identity	83.02	3.77	56.52	4.35	62.75	1.96

Figure 6: Percentage of Students who underwent partial-transformation (PT) or transformation (T) in each of the traits for each semester.

One of the main differences in these semesters was the type of training. The percentage of students who were trained in each semester was determined to look at the possibility that various types of training impact levels of transformation in LAs. This information can be found in the form of a bar graph in figure 7. The total LAs trained includes those that were trained in that current semester and those who had been trained previously. New LAs trained includes LA who are new to the program overall and those who may have been an LA in the past but did not complete the training. Previously trained LAs could have been trained in any previous semester. Each semester provided the LAs with a different approach to training. In Fall 2016, the training was six face-to-face seminars. In Spring 2017, the training had reduced face-to-face interaction. And in Fall 2017, the training was online.

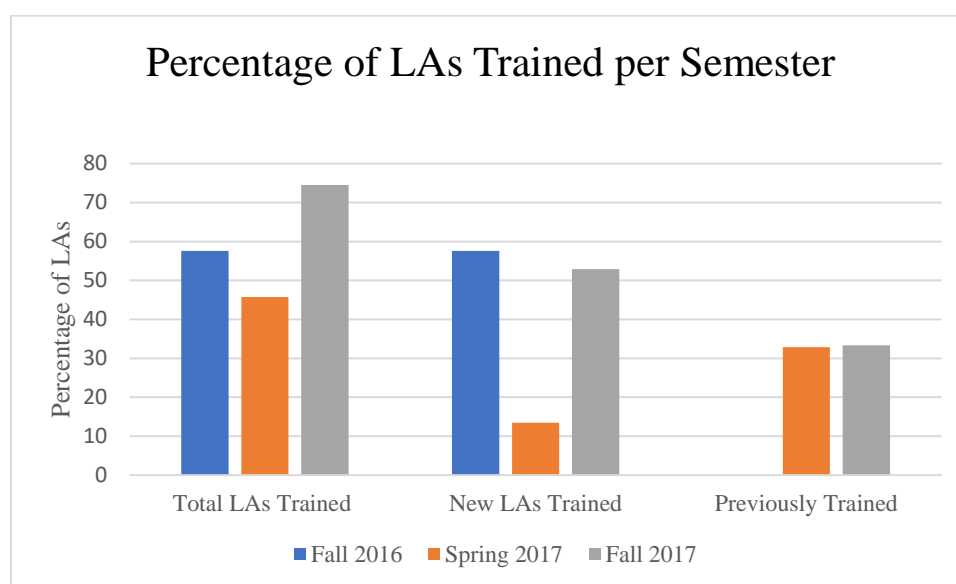


Figure 7: Percentage of LAs that underwent LA training for Fall 2016, Spring 2017 and Fall 2017.

In this graph it is evident that there were significantly fewer LAs that were trained in Spring 2017. The level of transformation in the trait of confidence was also lower for that semester. This shows that there is a possibility that LA training impacts transformation, especially in this trait of confidence. It also can be noted that since LAs showed the highest percentage of transformation in Fall 2016 and in that semester training was all face-to-face, that the face-to-face training may be the most beneficial to the students in terms of their transformation in these four traits.

DISCUSSION

The major focus of this study was to learn how to use the newly formed survey to better assess transformative learning. Learning how to code the survey was fairly simple when using the previously formed rubric and the past study as a guide for how to use it. The questions were developed to prompt responses that would show possible transformation, so it was easy to determine if the student had undergone some level of transformation. And by using the previous study as a guide, it was possible to figure out the differences in transformative gains versus

partially-transformative gains. Because the survey was straight forward to code for the desired results, it can be said that the newly developed survey was effective for this type of study.

The work with this revised survey also allowed for a new rubric to be created based on the types of responses that were being received. This rubric is more applicable to the position of an LA as the keywords and phrases are taken from the responses in this study. The rubric also clearly states the difference between partially-transformative responses and transformative responses. The creation of this new rubric will be helpful in taking the next steps in this research, which will be to look further at the effectiveness of different types of LA training. This new version of the rubric can be found as figure 2.

Based on initial review of the results in this study, it is clear that the Learning Assistant program in general is having a substantial effect on the students involved. In both Spring 2017 and Fall 2017, every single Learning Assistant (LA) achieved some level of transformation in at least one of the four traits.

Fall 2017 showed higher percentages of transformation in each of the traits than Spring 2017. There was also a significant difference in the percentage of LAs who were trained for each of those semesters. In Spring 2017, about 45% LAs were trained (with about 13% newly trained that semester with reduced face to face training). In Fall 2017 about 74% of LAs were trained (with about 53% newly trained that semester with online training). These results show that training may have an impact on transformation in the LAs. However, because the percent of LAs who completed training in Spring 2017 was so much lower, it is difficult to gauge if the difference in transformation was due to the type of training or just due to the lack of training. The percentage of LAs who had previous training in each semester were about equal, so it cannot be determined if previous training has an effect on the level of transformation.

Limitations

There were several limitations presented during this study.

One limitation was that the original rubric did not give clear instructions on how to code for partially-transformative versus transformative learning gains. Because of this, a method for how to code these different levels of transformation had to be better established. The original rubric also presented problems in the keywords and phrases that were given for each trait. Because the rubric was not specifically made for looking at transformation in Learning Assistants, not all of the key phrases applied. This issue was solved, however, with the formation of a new rubric.

Another limitation was that of the LAs that were surveyed, many had been LAs for several semesters. Because of this, they may have experienced transformation earlier in their experience as an LA and did not have as many new transformative gains. This does not mean that the LA program did not change them, just that change happened a while ago. Some of the student responses even showed this, for example:

“I didn't really have any reservations at the beginning of the semester. I have LAed for this class before and knew what to expect and what I would have to do as what as everything that was being covered in the class.”

Another limitation was in determining trained versus untrained Learning Assistants. While the overall list of LAs who had completed training was provided for this study, it was difficult to link specific responses to whether the LA had been trained or not. In the Spring 2017 survey, a single question was asked to determine if the student had been trained or not. Some students answered the question with the number of training sessions they attended, some stated that they had completed training in Fall 2016, some answered that they went to zero, and some did not answer at all. This made it hard because it was impossible to know if those students who answered zero were trained in the past or if those who didn't answer had any training. In Fall 2017, the issue was the same. There was a question that did ask respondents how many training seminars they had completed in the past, but it was impossible to know if they were in the same semester or in two separate semesters. And once again, there was the issue of not having a response at all.

Future Work

There are several avenues for future work regarding this study.

First, it could also be interesting to look at the levels of transformation in experienced LAs from their first semester to the current semester that they are in. This could easily be done by adding another question to the survey asking students if they had been an LA previously, how they have changed since the start of their time as an LA. It This would also deal with the issue mentioned above, since the current survey only asks about each semester, not the overall experience.

Next, regarding the limitation with determining training, it would be helpful in future studies to have a way to match each student with the training they had. This could easily be done by numbering the students, so their training results can be linked with their survey responses.

A good next step would be to compare how the different types of training affected levels of transformation. Since this was one of the initial goals of the current study the proper methods for doing this have been set up, it is just a matter of applying the correct improvements to make this study a success in the future. One thing that would be beneficial in doing this is a larger sample size. This would make it easier to test for statistical significance in transformation in the different types of training.

CONCLUSION

The purpose of this study was to refine measurement of transformative learning in Learning Assistants, so that it will be possible to look at the impact of various approaches to training. Through the use of the revised survey, this goal was met. The questions presented in the survey effectively prompted students to provide the desired results, which were answered that showed their level of transformation. The big gain from this study was the formation of a new rubric (figure 2) to assess these responses for signs of transformation, which will be useful in the continuation of this research. There are still some improvements that can be made to better this research, but progress is being made.

Another goal of this study was to determine how different types of training would affect levels of transformation in Learning Assistant, however, it was not possible to answer this question based

on the data that was provided. The study did show the possibility that training impacts transformation, but no solid conclusion can be made.

Works Cited

- Allen, D., and K. Tanner. "Infusing Active Learning into the Large-Enrollment Biology Class: Seven Strategies, from the Simple to Complex." *Cell Biology Education*, vol. 4, no. 4, Jan. 2005, pp. 262–268.
- Apte, Judi. "Facilitating transformative learning: a framework for practice." *Australian Journal of Adult Learning*, vol. 49, no. 1, Apr. 2009, pp. 169–189.
- Autthaporn, Jirapha, and Prakob Koraneekij. "Effect of Using Online Active Instructional Model to Enhance Learning Behaviors of Undergraduate Students." *International Journal of Social Science and Humanity*, vol. 6, no. 3, 2016, pp. 165–171.
- Dennis, J. "Problem-Based Learning in Online Vs. Face-To-Face Environments." *Education for Health: Change in Learning & Practice (Taylor & Francis Ltd)*, vol. 16, no. 2, July 2003, p. 198.
- Eison, J. (2010). Using active learning instructional strategies to create excitement and enhance learning. *Jurnal Pendidikantentang Strategi Pembelajaran Aktif (Active Learning) Books*, 2
- Jakyma, Katelyn (2017). Evaluation of Learning Assistant Training Seminar Effectiveness (Unpublished undergraduate honors thesis, Advisor K. Sirum). Bowling Green State University, Bowling Green, OH.
- MacKinnon, S. L. (2017). 'The curiosity project': Re-igniting the desire to inquire through intrinsically-motivated learning and mentorship. *Journal of Transformative Learning*, (4)1, 4-21.

Otero, Valerie, et al. "A physics department's role in preparing physics teachers: The Colorado learning assistant model." *American Journal of Physics*, vol. 78, no. 11, 2010, pp. 1218-1224.

Springfield, Emily, et al. "Transformation Rubric for Engaged Learning: A Tool and Method for Measuring Life-Changing Experiences." *International Journal of ePortfolio*, vol. 5, no. 1, 2015, pp. 63-74.